

# Redescription of *Austrochthonius australis* Hoff (Chthoniidae: Pseudoscorpionida)

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An examination of approximately 150 specimens of *Austrochthonius australis* Hoff from various locations in southeastern Australia suggests a considerable size variation within the species when compared with the two published descriptions of adults (Hoff, 1951; Beier, 1966). For the first time the nymphal stages are described.

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## INTRODUCTION

*A. australis* is widely distributed in a variety of habitats throughout Australia. The description of the holotype is based on a single female specimen from Mt Slide, Victoria. Beier (1966) has briefly described male and female specimens based on an examination of material from Western Australia, Victoria, New South Wales, Australian Capital Territory and Tasmania.

Investigation of specimens from Western Australia, identified as *A. australis*, has revealed a number of differences from the holotype suggesting that an undescribed species is represented. In addition, individuals of a population in the Sydney region are much smaller, when compared with the two published descriptions of the adult by Hoff (1951) and Beier (1966); this prompted examination of some 150 specimens from various locations in Victoria, New South Wales and Tasmania to determine if specimens identified as *A. australis* are in fact a single species. Apart from size, specimens examined are morphologically similar to the holotype.

The results of this research are presented below and represent a more comprehensive description of the species which for the first time, incorporates the nymphal stages.

## MATERIALS AND METHODS

Specimens were borrowed from the following institutions: American Museum of Natural History, New York; Australian Museum, Sydney; Museum of Victoria, Melbourne and 34 samples from the private collection of Dr. M. S. Harvey, Western Australian Museum, Perth.

Measurements are based on the examination of at least 5-15 adults of each sex from various locations in south eastern Australia made in accordance with those described by Chamberlin (1931). Figures in parentheses are female values and follow those of the male. The morphological nymphal information is based on measurements of 10 specimens of each stage collected from the Sydney region. Nymphs from the other regions within the distribution of the species are, at present, unavailable for comparison.

Abbreviations for chelal trichobothria and setal formulae follow those devised by Chamberlin (1931). Genitalia terminology follows that of Legg (1975). Specimens of *A. australis* from the Sydney region are deposited in the Australian Museum, 6 ♂ (KS 20186), 6 ♀ (KS 20187), 6 nymphs (KS 20188).

## SYSTEMATIC DESCRIPTION

CHTHONIIDAE Hansen 1893

*Austrochthonius* Chamberlin 1929**Type species:** *Chthonius chilensis* Chamberlin 1923*Austrochthonius australis* Hoff

(Figs 1-4)

**Diagnosis:** Chelicera with 5 setae on hand; palpal teeth quadrate and separated; 6 pinnate coxal spines present on coxa 2; intercoxal tubercle absent. L/W ratio of chela (with pedicel) range 1:1.05-1.33 (1: 1.03-1.45) x longer than broad.

**Description:** Adults. Colour light golden brown; carapace surface smooth; pleural membrane with series of irregularly spaced longitudinal ridges, each with minute, elevated, white nodules (Fig. 1A). Pedipalp: trochanter stout, femur with lateral margins virtually parallel, abruptly converging distally, L/W ratio range 1: 1.00-1.65 (1:

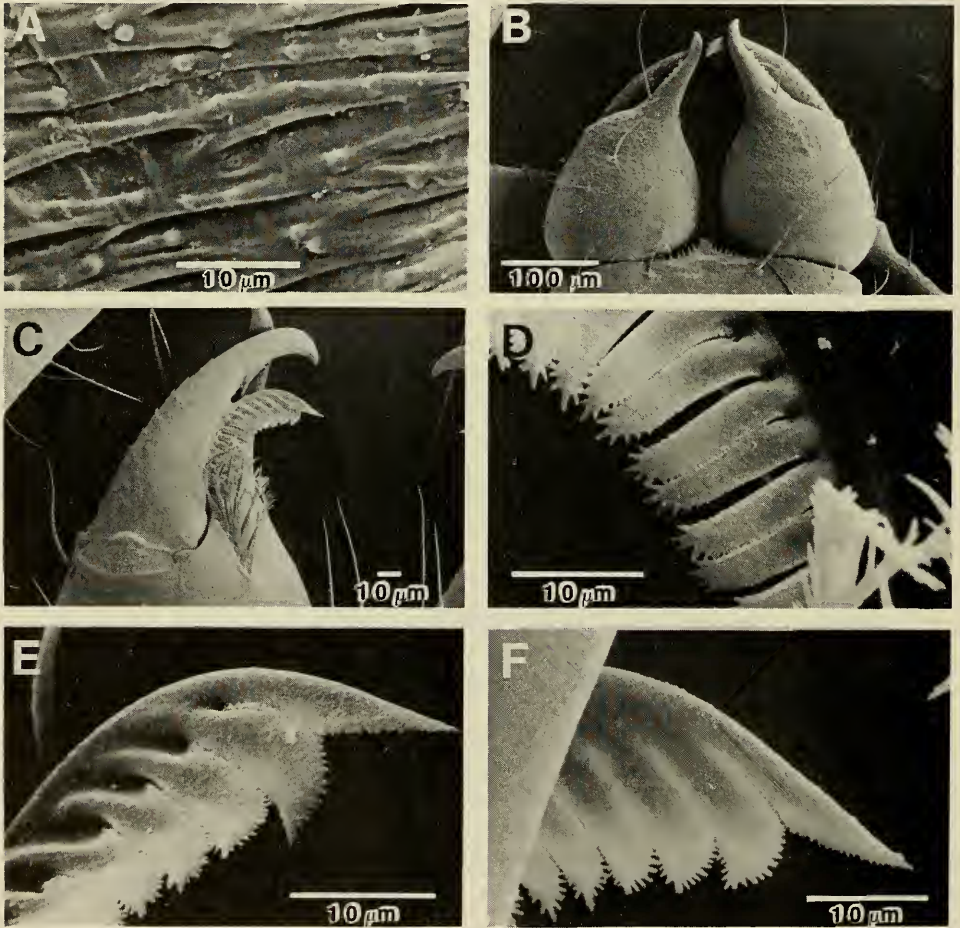


Fig. 1. *Austrochthonius australis* Hoff, scanning electron micrographs, male: A, pleural membrane; B, chelicerae, dorsal aspect; C, right chelicera movable finger, ventral aspect; D, left chelicera, serrula exterior proximal blades; E, right chelicera, serrula exterior distal blades, ventral aspect; F, right chelicera, serrula exterior distal blades, dorsal aspect.

1.00-1.65), tibia calyciform; chelal hand broad and shorter than chelal fingers, lateral margins very slightly rounded, poorly developed pedicel, L/W ratio of chela (with pedicel) range 1: 1.05-1.33 (1: 1.03-1.45), chela (without pedicel) 1: 1.03-1.31 (1: 1.01-1.42) x longer than broad. Chelal fingers long and tapering, fixed finger with 8 trichobothria, *ib* and *isb* medial on dorsum of chelal hand; movable chelal finger with 4 trichobothria; marginal teeth quadrate, separated and retrorse on fixed finger, teeth smaller on movable finger becoming broader with rounded apices and laterally fused proximally, 46-50 (♂) 45-46 (♀) (Fig. 4T); venom apparatus absent. Chelicera large, stout with 5 setae on hand, fingers cross distally (Figs 1B, 4S), fixed finger with reticulate sculpture, teeth 15-16 (♂) 15-17 (♀), distal one large, remainder diminishing in size proximally; movable finger with 18 well-spaced smaller teeth which become almost indistinguishable proximally; lamina exterior absent. Serrula exterior detached in upper half with 14-

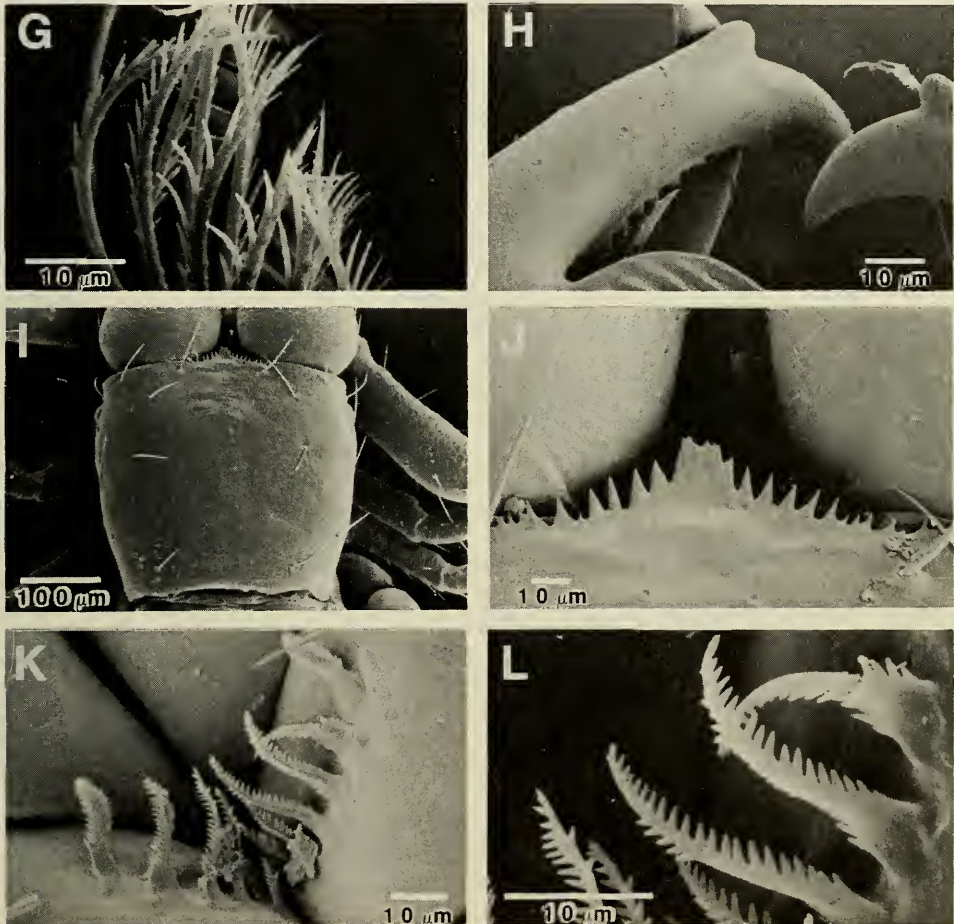


Fig. 2. *Austrochthonius australis* Hoff, scanning electron micrographs, male: G, right chelicera, flagellum blades, ventral aspect; H, female, right chelicera showing galea a sclerotic tubercle; I, carapace; J, male, epistome; K, coxal spines; L, enlargement of pinnate coxal spine blades.

15 (♂) 14 (♀) lamellae (Fig. 1C), lamellae relatively broad, elongate, with parallel sides proximally, terminally each blade digitate (Fig. 1D) becoming broad distally (Figs 1E,

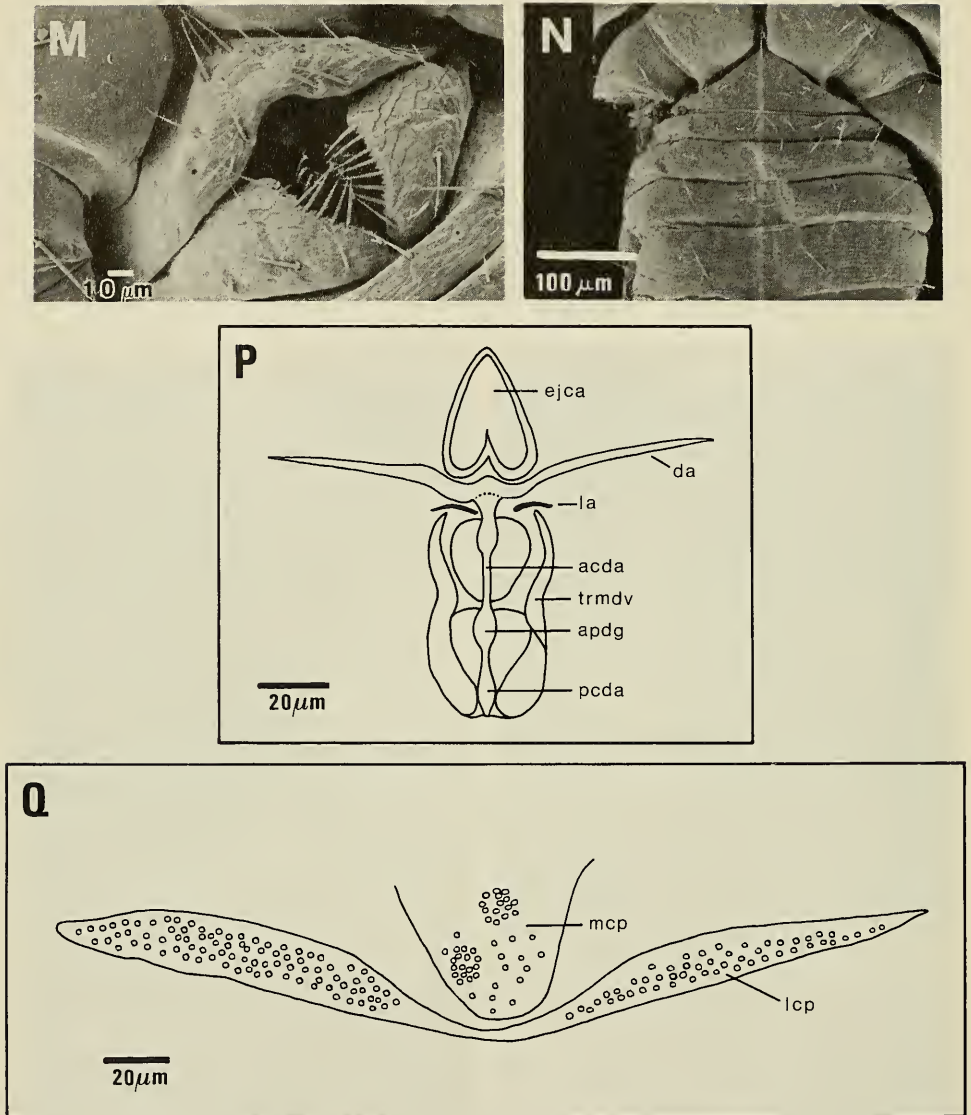


Fig. 3. *Austrochthonius australis* Hoff, scanning electron micrographs: **M**, male genital region, external aspect; **N**, female genital region, external aspect; **P**, male genitalia, internal aspect; **Q**, female genitalia, internal aspect.

**F**); galea a sclerotic tubercle in ♀ (Fig. 2H), absent in ♂; galea seta basad of mid-point of movable finger. Flagellum with 8 stalk-like blades each arising separately along a diagonal slit basad of fixed cheliceral finger (Fig. 1C) becoming unipinnate distally (Fig. 2G). Carapace: subquadrate, surface smooth; anterior margin slightly serrate laterally with prominent, blunt, dentate epistome (♂) (Fig. 2J), more or less acute (♀), weakly reticulate sculpture; lateral margins distinctly narrowed posteriorly (Fig. 2I); posterior margin relatively straight; setae long, acuminate 4: 2: 12 (♂), 4: 2: 12-14 (♀); L/W ratio

(based on ocular width) range 1: 1.00-1.13 (1: 1.03-1.36), (based on posterior width) 1: 1.07-1.52 (1: 1.12-1.33) x longer than broad. Anterior eye well developed, posterior eye flattened disc. Tergal chaetotaxy: setae relatively long, acuminate, ♂ 4: 4: 3-4: 2-4: 6: 6-7: 6: 4: 4-5: 4: 4: 2; ♀ 4: 4: 4: 4: 4: 4: 6: 6: 6: 4-5: 2. Uniseriate. Coxal chaetotaxy: 6 pinnate coxal spines placed anterior-ventrally along proximal half of coxa 2 (Figs 2K, L) ♂ 2: 2: 1, 0: 3: 1, 0: 3: 2, 0: 2: 3-4, 0: 2: 4; ♀ 2: 2: 1-2, 0: 3: 2, 0: 3: 1, 0: 2-3: 4-5, 0: 2: 3. Intercostal tubercle absent. Male genitalia (Fig. 3P): ejaculatory canal atrium (ejca) pear-shaped; roof of each medial diverticulum thickened (trmd) to form two elongated structures, anterior horns of each free but fused posteriorly, in mid-line is atrium of posterior dorsal gland (apdg). Cuticle of genital atrium thickened and extended to form apodemes; dorsal apodeme (da) well developed with Y-shaped structure below ejaculatory canal atrium (ejca), posterior extension of Y forms anterior crest of dorsal apodeme (acda), posterior to atrium of posterior dorsal gland (apdg) the posterior crest of the dorsal apodeme (pcda) arises in mid-line above duct of median genital sac; lateral apodemes (la) reduced and thickened to provide attachment for muscles of ejaculatory canal and support for anterior region of genital region of genital atrium. Chaetotaxy: anterior operculum with 8-9 relatively long setae along anterior margin, 4-5 along posterior margin which is deeply concave medially; posterior operculum with 8 relatively long acuminate setae on each side of a deep median notch. These setae project into the centre forming a grill-like pattern across the genital atrium (Fig. 3M). Female genitalia (Fig. 3Q): lateral cribriform plates (lcp) clearly differentiated with numerous pores; median cribriform plate (mcp) — pores scattered over the surface with some aggregations. Chaetotaxy: anterior operculum a triangular plate; posterior operculum a simple elongate plate (Fig. 3N). Sternites with reticulate sculpture, chaetotaxy: ♂ 0: 13-14: 26-27: 4: 4: 3-4: 4: 6: 6: 4-6: 4-6: 2; ♀ 0: 10: 10-12: 8: 6: 4-6: 6: 6: 6: 2, setae long, acuminate. Sternites 4-11 uniseriate.

Dimensions (mm): body length 0.75-1.17 (0.77-1.62); pedipalp: femur 0.21-0.36/0.07-0.10 (0.21-0.46/0.07-0.10), chela (with pedicel) 0.43-0.61/0.09-0.13 (0.45-0.70/0.10-0.16), chela (without pedicel) 0.41-0.59/0.09-0.13 (0.41-0.68/0.10-0.16), movable finger length 0.25-0.37 (0.28-0.45). Carapace 0.27-0.37/ocular width 0.27-0.41/posterior width 0.21-0.34 (0.28-0.46/ocular width 0.30-0.48/posterior width 0.26-0.43).

Tritonymph. L/W ratio: pedipalpal trochanter 1.00-2.00, femur 2.28-3.00, tibia 1.28-1.42, chela (with pedicel) 3.55-4.33, chela (without pedicel) 3.33-4.11 x longer than broad. Fixed finger with 7 trichobothria, movable finger with 3 trichobothria, *isb* and *sb* absent; serrula exterior of chelicera with 11-12 broad, elongate lamellae, each blade digitate terminally. Carapace: anterior margin slightly serrate laterally, epistomal process prominent; posterior margin relatively straight; lateral margin narrowing at point of union with abdominal segments, 4: 2: 8, setae long, acuminate. L/W ratio (based on ocular width) 1.08-1.25, (based on posterior width) 0.96-1.00 x longer than broad. Tergal chaetotaxy: 4: 4: 4: 4: 4-6: 4-6: 6: 6: 6: 4: 4-6: 2. Sternal chaetotaxy: 0: 3-4: 6-7: 6: 6: 4: 4: 6: 6: 6-7: 5-6: 2. Coxal chaetotaxy: 4-5 coxal spines in medial position along anterior margin of 2nd. coxa, 2: 2: 1, 0: 3: 0, 0: 3: 2-3, 0: 1: 2-4, 0: 1: 3-4.

Dimensions (mm): body length 0.66-0.79; pedipalp: trochanter 0.07-0.09/0.05-0.07, femur 0.16-0.21/0.07, tibia 0.09-0.10/0.07, chela (with pedicel) 0.32-0.39/0.07-0.09, chela (without pedicel) 0.30-0.37/0.07-0.09, movable finger length 0.19-0.27; carapace 0.27-0.30/ocular width 0.27-0.31/posterior width 0.22-0.25.

Deutonymph. L/W ratio: pedipalpal trochanter 1.20-1.40, femur 2.00-3.20, tibia 1.00-1.75, chela (with pedicel) 3.75-4.50, chela (without pedicel) 3.28-4.16 x longer than broad. Fixed finger with 6 trichobothria, movable finger with 2 trichobothria, *isb*, *esb*, *sb*, *b* absent; serrula exterior of chelicera with 9-10 broad, elongate lamellae, each blade

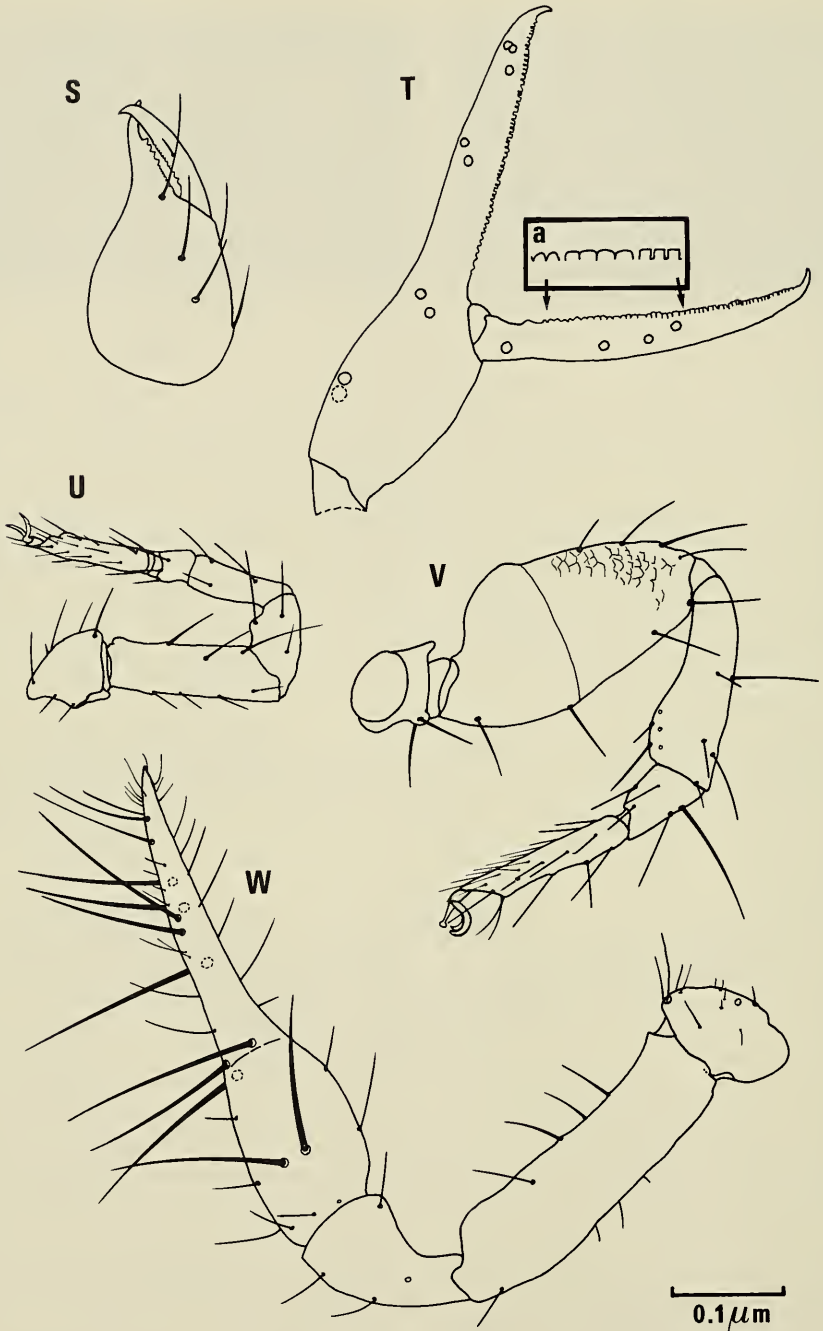


Fig. 4. *Austrochthonius australis* Hoff, male: S, right chelicera, dorsal aspect; T, right chela, lateral aspect; Ta, inset, enlargement showing dentition type (not to scale); U, first right leg; V, fourth right leg; W, left pedipalp, dorsal aspect.

digitate terminally. Carapace: anterior margin serrate, epistome prominent; 4: 2: 8: 3-6 relatively long setae, 1.05-1.18 x longer than broad (ocular and posterior width equal). Tergal chaetotaxy: 4: 4: 4: 2-4: 4-6: 4-6: 4-5: 5-6: 4-5: 4-6: 5-6: 2, setae, long, acuminate posteriorly. Sternal chaetotaxy: 0: 4: 4: 4-6: 4-6: 6: 4: 4: 4-6: 4-6: 6: 2. Sternites 3-5 divided. Coxal chaetotaxy: 3-4 coxal spines in medial position along anterior margin of 2nd. coxa, 2: 2: 1, 0: 2-3: 0, 0: 2: 1, 0: 1-2: 1, 0: 1: 2.

Dimensions (mm): body length 0.48-0.63; pedipalp: trochanter 0.06-0.07/0.05, femur 0.12-0.16/0.04-0.07, tibia 0.07/0.05-0.07, chela (with pedicel) 0.25-0.28/0.06-0.07, chela (without pedicel) 0.23-0.27/0.06-0.07, movable finger length 0.14-0.19; carapace 0.19-0.23/0.16-0.20.

Protonymph. L/W ratio: pedipalpal trochanter 1.25-1.33, femur 2.20-3.00, tibia 1.25-1.50, chela (with pedicel) 3.33-4.00, chela (without pedicel) 3.16-3.80 x longer than broad. Fixed finger with 3 trichobothria, *ist*, *et*, *eb* present; movable finger with 1 trichobothrium, *t* present; serrula exterior of chelicera with 7-8 broad, elongate lamellae.

Carapace: anterior margin smooth, slightly dentate medially, 4: 2: 5: 3 setae, 1.06-1.16 x longer than broad (ocular and posterior width equal). Tergal chaetotaxy: 2: 2-3: 2-3: 2-3: 4: 3: 3-4: 3: 4: 3-4: 4-5: 2. Sternal chaetotaxy: 0; 2-3: 3: 4: 2-3: 2-4: 4: 4: 3-4: 3-4: 4: 2. Coxal chaetotaxy: 3-4 small coxal spines along anterior margin of coxa 2, 2: 2: 1, 0: 2: 0, 0: 2: 0, 0: 1-2: 1, 0: 1: 1.

Dimensions (mm): body length 0.36-0.45; pedipalp: trochanter 0.04-0.05/0.03-0.04, femur 0.09-0.11/0.03-0.05, tibia 0.05-0.06/0.04, chela (with pedicel) 0.17-0.22/0.05-0.06, chela (without pedicel) 0.16-0.21/0.05-0.06, movable finger length 0.11-0.14; carapace 0.14-0.17/0.12-0.16.

#### DISCUSSION

Only two species of the genus *Austrochthonius* Chamberlin are recorded from Australia namely: *A. australis* Hoff and *A. cavicola* Beier (1968). Results of this investigation are based on the examination of specimens from locations ranging from lat. 33°45' S, long. 150°57' E to lat., 41°49' S, long. 145°37' E and suggest a considerable size variation exists within *A. australis* which is not consistent with clinal variation.

While size is important, body length was not considered a reliable guide in itself because measurements can vary considerably due to a number of factors; for example, the freshness of material, the inclusion of gravid specimens, the nature of preservative and length of time in fixative. Consequently, the results of this research are based on measurements of important specific morphological features which remain relatively constant within populations.

A comprehensive description of the nymphal population is presented for the first time and is therefore applicable only to the small specimens recovered from the Cumberland State Forest, Sydney, N.S.W. Lack of material representative of southeastern Australia precluded a reliable assessment in this respect.

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